

### **Abstract of the Disclosure**

Apparatus and methods for optical illumination and/or detection with improved flexibility and/or read speed. The apparatus and methods may include mechanisms for selecting and switching between multiple excitation wavelengths and/or simultaneously reading from a plurality of sample sites. The apparatus and methods may be used with microplates, PCR plates, cell culture plates, biochips, chromatography plates, microscope slides, and other substrates for high-throughput screening, genomics, SNPs analysis, pharmaceutical research and development, life sciences research, and other applications.